



A ROBOTICS SUCCESS: Deployment of the Modified Brokk Demolition Machine with Remote Console

The Problem: Many U. S. Department of Energy (DOE) facilities have completed their useful lives and are in the process of being deactivated and decommissioned. In order to ensure worker safety, remote systems that keep workers removed from demolition areas are needed.

The Technology: The Brokk demolition machine, developed by Holmhed Systems AB in Skelleftea, Sweden, is a remote-controlled concrete demolition system that replaces hand-held equipment like jackhammers. The DOE Office of Science and Technology Robotics Crosscutting Program (Rbx) modified the Brokk to include a remote console and image-stabilizing cameras to enable truly remote operation.

The Brokk now can be operated from the Rbx-designed Compact Remote Operator Console. The operator sits in an ergonomic command chair in front of four 15-in. flat video panels, which display the selected remote camera views. A computer with a touch-screen monitor controls the four image-stabilizing video cameras. The operator uses the original Brokk controller to remotely operate the hydraulic boom's movement. The Rbx developed the fiber optics, the stationary zoom cameras (which are set around the Brokk machine for viewing), two similar cameras mounted on the Brokk itself, and the software to run the video feed.

The Deployment: The Brokk without the new remote console or other modifications was deployed at the former Security Training Facility (STF) at the Idaho National Engineering and Environmental Laboratory (INEEL) in June and

July of 1999. In January 2000, Rbx and INEEL deactivation and decommissioning employees demonstrated the modified Brokk machine at the

INEEL STF. An operator using the new remote console remotely controlled the modified Brokk from an enclosed trailer that was far removed from the work area. The system was used to remotely remove, size-reduce, and



stage overhead piping and facility equipment located in the basement of the STF.

The Benefit: The Modified Brokk Demolition Machine with Remote Console allows the operator to be at a safe distance from areas with high radiation, falling debris, or other environmental concerns. Remote video provides the capability to do work out of the operator's line of sight. Working time using the Brokk is less than half that of most operations performed using manual tools, significantly reducing cost and schedule. The modified system is expected to prove useful for a wide range of tasks in various work conditions ranging from breaking, removing, and loading concrete debris to removing radioactive waste from high-radiation areas.

For more information on this project please contact:

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